

U.S. Patent Application Serial No. 09/351,544

Declaration of Timothy K. Carns

Document E

PAGE No.: 01

FROM WFN0055 REV. 27
SPECIAL TEST REQUEST FORM
Electronic Version

ISSUE DATE: 07-13-98
MAINTAINED BY: ICS Nampa
UPDATE FREQUENCY: BY CN

FIGURE 1

STR APPROVAL#: 857
PURPOSE: CAPACITOR LEAKAGE
DATE: 01/07/1999
LOT #: E0034
PROCESS FLOW: Z37223
IMPACT ON DPW YLD.: UNKNOWN

SPECIAL TEST REQUEST
STR SN#: 9700813
ORIGINATOR: S. GIRLANI
MARKETABLE: N
PRODUCTION REJECTABLE: N

DEVICE: 87L02AAR4107

*** WAFER PROBE DISPOSITION INSTRUCTIONS ***

[X] Wafer Start Material - Non-standard
[X] Photomasks In House - Non-Standard *
[X] DI CD Requirements - Non-Standard
[X] FI CD Requirements - Non-Standard
[X] Implant Doses - Non-Standard
[X] Process Eval Tests - Non-Standard
[X] Wafer Probe Set Up - Non-Standard *

(Any Test Program or Test Temperature Changes Require an STWR)

*** NON-STANDARD PROCESS REQUIREMENTS AND HOLD POINTS ***

LOCATION MASK LEVEL LOC. NAME
0 MULTI-OPER
USE UNRELEASED MASK SET FOR Z87L02AAR4107
FOLLOW THE ATTACHED RUNCARD FOR ALL STEPS

APPROVALS

QA DIR : David Nuerenberg	DATE: 1/8/99	FAB OPER MGR : [Signature]	DATE: 1/7/99
PLANNING REP : S. Veltrop	DATE: 1/8/99	TD MGR** [Signature]	DATE: 1-7-99
PRODUCT ENG. MGR: [Signature]	DATE: 1/8/99	ENG. MGR: [Signature]	DATE: 1/7/99
PROD MGR: [Signature]	DATE: 1/8/99	PAT1 MGR: [Signature]	DATE: []

* REQUIRES PAT1 MGR SIGNATURE
(FOR WAFER PROBE OR MOD2 PEVAL)
** TD MGR APPROVAL FOR TD STRs

L

87L02 CAPACITOR OXIDE SPLIT

Wafer #	Capacitor Oxide	L39 IPD Removal	Cap. Spacer Oxide	Pre-clean	Capacitor Spacer Oxide Thick (A)	Spacer Etch	Pearl Deposition	L40 D1CD Splits	L40 Poly Etch	Hook Wafer
1	Novellus	---	---	---	---	---	Y (325A)	Y	A	D1261: 18-20 D1549: 8 & 18
2	Novellus	---	RTP	---	---	---	Y (325A)	Y	A	
3	Novellus	---	RTP	---	---	A	Y (325A)	Y	B	
4	Novellus	---	DEP	Y	1000	B	Y (325A)	Y	B	
5	Novellus	---	DEP	Y	2250	C	Y (325A)	Y	B	
6	Novellus	Dry Strip, BOE	---	---	---	---	Y (325A)	Y	B	D1114-4
7	Novellus	Dry Strip, BOE	RTP	---	---	---	Y (325A)	Y	B	
8	Novellus	Dry Strip, BOE	RTP	---	---	D	Y (325A)	Y	B	
9	Novellus	Dry Strip, BOE	DEP	Y	1000	E	Y (325A)	Y	B	
10	Novellus	Dry Strip, BOE	DEP	Y	2250	F	Y (325A)	Y	B	
11, 12	Novellus	NO Dry Strip, BOE	---	---	---	---	Y (325A)	Y	B	
13, 14	Novellus	Dry Strip, Dry Etch	---	---	---	---	Y (325A)	Y	B	
15, 16	Novellus	Dry Strip, Dry Etch	RTP	---	---	---	Y (325A)	Y	B	
17	Novellus	Dry Strip, Dry Etch	RTP	---	---	D	Y (325A)	Y	B	
18	Novellus	Dry Strip, Dry Etch	DEP	Y	1000	E	Y (325A)	Y	B	
19	Novellus	Dry Strip, Dry Etch	DEP	Y	2250	F	Y (325A)	Y	B	
20, 21	Novellus	Dry Etch, Dry Strip	---	---	---	---	Y (325A)	Y	B	
22, 23	Novellus	---	---	---	---	---	Y (800A)	Y	C	
24	Novellus	Dry Strip, BOE	---	---	---	---	N	Y	D	D1315-15
25	Novellus	Dry Strip, Dry Etch	---	---	---	---	N	Y	D	

87L02 CAPACITOR OXIDE SPLIT

Main objective of the proposed splits
Minimal process modification from Z-70 process flow.

Questions to be answered:

Poor leakage capacitor performance on SLM 270 and emission around the edges of capacitor from hypervision experiment suggest that we have the following possibility of leakage path:

1. Undercut of capacitor oxide using BOE. This issue is investigated by implementing spacer oxide (RTP vs. DEP—1000 vs. 2250 Å), dry/wet etch oxide and/or not removing oxide at L39.
2. Contamination of Pearl and capacitor oxide in undercut region. This issue is investigated by implementing spacer oxide step and not removing oxide at L39.
3. Pearl layer touching both poly 1 and poly 2. This issue will be resolved by not removing the oxide at L39.

The swing effect remains on the wafers that receive no oxide removal step. This effect is also investigated in the proposed splits:

1. By increasing pearl layer thickness to 800Å. This step requires some photo and CMP development.
2. By eliminating pearl layer. This step will reduce the line width control of L40.

The effect of dry resist strip vs. no dry strip at L39 is also investigated for IPO removed with BOE and Dry Etch techniques.

Spacer Etch:

- A = ~50Å RTP Spacer Oxide + 375Å Capacitor Oxide
- B = 1000Å Deposited Spacer Oxide + 375 Å Capacitor Oxide
- C = 2250Å Deposited Spacer Oxide + 375Å Capacitor Oxide
- D = ~50Å RTP Spacer Oxide
- E = 1000Å Deposited Spacer Oxide
- F = 2250Å Deposited Spacer Oxide

L40 Etch:

- A = Pearl (325Å) + Oxide (400Å) + Poly 1
- B = Pearl (325Å) + Poly 1
- C = Pearl (800Å) + Oxide (375Å) + Poly 1
- D = Poly 1

LOT #

50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
30	WAFER START	WF31500						25	-	10839
	LASER SCRIBE	WF37030	LAS01	LASER SCRIBE				25	-	10839
	CLEAN	WF33030	FCL0X	CLEAN			STARTS	25	-	10839
	PARTICLE COUNT	WF36051	PCT01	PC	<30 LPD@0.2 um	PC 2	BARE20	25	-	10839
	DIFF LENGTH	WF36055	SDI01	DIFF. LENGTH IRON	> 350 um < 9e10 atoms/cm3	DL MEAN 570 Fe 25 e 10		25	-	10839
35	CLEAN	WF33020	DCL0X	CLEAN			NOSIP-OX	25	1/9	11167
	NOSIP OXIDATION	WF33015	TVF01 HVFOX	OXIDATION		H-V F04	100NOSIP	25	1-8	10892 11311
	PARTICLE COUNTS	WF36051	PCT01	PC	<30 LPD@0.3 um	PC 1	SIO2-300	25	1-8	11571
	THICKNESS MEAS.	WF33050	ELP01	TOX	100+/-20 ANG.	TOX MEAN 102 WFR RANGE 4-163	NOSIP OX	25	1-8	11571
	1ST NITRIDE DEP	WF33015	NVFOX				NITRIDE	25	1/8	11563
37	PARTICLE COUNT	WF33015 WF36051	PCT01	PC	<150 LPD@0.3 um	PC 1148-47	NITRIDE30	25	1/9	11568
	THICKNESS MEAS.	WF33015 WF33050	ELP01	TNIT 149 1546	1500+/-150 ANG	TNIT MEAN 1519 WFR RANGE 41	1ST-NITRIDE-Z70	25	1/9	11568
	RI MEASUREMENT	WF33015 WF33050	ELP01	RI 2.022 2.026	2.027+/-0.03	RI MEAN 2.025 2.024	1ST-NITRIDE-Z70	25	1/9	11568

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LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
95 L10 S/D MASK	COAT	WF34005	DNSOX				3	25	1-9	11361
	ALIGN	WF34004	I4 ONLY EXPO9		1st Exposure	RETICLE # 111280	14: 1600 / 0	25	1-9	11361
	DEVELOP	WF34005	DNSOX				3	25	1-9	11361
	DICD	WF33430	SEM0X	DICD DENSE	0.80 +/- 0.08	MEAN .7667 3 SIGMA .069		25	1-9	10485
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE		1N501	25	1-9	10233
* ETCH USING NITRIDE ETCH SYSTEM *										
99	NOSI ETCH NITRIDE	WF35050	PETOX			WFR # 13	P_Z7nitride	25	1-9	10672
	OXIDE REMAINING	WF33050	PUVOX	TOX REMAINING	70 +/- 15 ANG.	TOX MEAN .65 SDEV .166	NOSI-Nitride	25	1-9	10672
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			25	1-9	10708
* ETCH USING POLY ETCH SYSTEM *										
101	NOSI ETCH TRENCH	WF35050	PETOX			WFR # 13	P_Z7trench	25	1-9	10672
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			25	1-9	11101
	DRY STRIP	WF35030 WF35035	MASOX ASHOX			END PT. TIME 11 COMPLETE TIME 1415	ASH	25	1-9	11101
	FSI STRIP	WF33030	RSTOX			RSTOX	RESIST-STRIP	25	1-9	10672
	STEP HEIGHT	WF35000	OLY01	STEP HEIGHT	0.23 +/- 0.023 um	MEAN .2335 3SIG .014		25	1-9	10589
	FICD	WF33430	SEM0X	FICD DENSE	0.75 +/- 0.08	MEAN 0.825 3SIG 0.101		25	1-9	11101
	FINAL INSPECT	WF31025	INSOX	POLYMER	NONE	INSOX		25	1-9	11101

LOT #

50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
102	CLEAN	WF33020	DCLOX			DECL01	STEAM-OX	25	1/9	11219
	STEAM OX	WF33015	TVF01 HVF0X			*HVF01/HVF03 TOX MEAN 5267 WFR RANGE 1.10-1.11	5KSTEAM	25	1/9	11571
	THICKNESS MEAS.	WF33015 WF33040	PUV0X	TOX	5000+/-500 ANG.	TOX MEAN 5267 WFR RANGE 1.10-1.11	STEAM-OX	25	1-9	10702
	NITRIDE STRIP	WF33020	NST01				NITRIDE STRIP	25	1-10	10892
104	OXIDE REMOVED	WF33020 WF33050	ELP01	OX REMOVED	+10 OR -80 ANG.	REMAINING OX 90	NIT STRIP	25	1.10	10702
	FINAL INSPECT	WF31025	INSOX2	RES. NITRD W. RIBBON	NONE			25	1.10	10702
	CLEAN	WF33020	DCLOX1				RIBBON-OX	25	1-10	10702
	RIBBON OX	WF33015	HVF0X			HNF04	300OXIDE	25	1-10	11571
106	THICKNESS MEAS.	WF33015 WF33050	ELP01	TOX	300 +/- 30 ANG.	TOX MEAN 300 WFR RANGE 2.6	RIBBON-OX	25		
						248 300				

LOT #

E0334

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
162	N-WELL CHAIN IMPLANTS (1, 2, and 3)									
	THERMAWAVE	WF33000	IMP04 ONLY				QUASIMODO	25	1-12	10808
		WF36050	TWU01	TWU		TWU MEAN 1542.5 UNF 176		25	1-12	10808
387	N-WELL VT IMPLANT									
	THERMAWAVE	WF33000	IMP04 a3				JETSAM	25	1-12	10808
		WF36050	TWU01	TWU		TWU MEAN 1583.6 UNF 187		25	1-12	10808
388	DRY STRIP	WF35030 WF35035	MASOX ASHOX			END PT. TIME 87 COMPLETE TIME 2350	ASH 03	25	1-12	2240
	FSI STRIP	WF33030	RSTOX 01				RESIST-STRIP	25	1-12	2255
	FINAL INSPECT	WF31025	INSOX 04	VISUAL DEFECTS	NONE			25	1-13	0140

LOT # 6034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
392	CLEAN(NO HF)	WF33030 WF33020	FCLOX DELUX	OL			BEECLEAN	25	1-13	JH
	WELL ANNEAL	WF33015	TVF01 HVF06				WELANNEL	25	1-13	10537
	CLEAN/OXIDE STRIP	WF33020	DCLOX				OXIDE	25	1-13	10131
394	Z70 GATE	WF33015	TVF01 HVF08				64THINOX	25	1-13	10859
	THICKNESS MEAS.	WF33015 WF33050	ELP01	TOX	64 +/- 5 ANG.	TVF01 TOX 65 WFR RANGE 2	Z70 GATE	25	1-13	10551
	GATE RTP	WF33010	RTP01				sleepy.1	25	1-13	10894
398	THICKNESS MEAS.	WF33010 WF33050	ELP01	TOX	70 +/- 5 ANG.	TOX 72.5 RANGE 1.92	Z70 GATE	25	1-13	10883
	*****DIRECT TRANSFER TO AMORPHOUS SI DEPOSITION*****									
	AMORPHOUS SI DEP	WF33015	PVF03				AMORPH	25	1-15	10892
425	PARTICLE COUNTS	WF35040	KLA01	PARTICLE COUNTS	<200 PC'S ADDED	POST COUNT 0		25	1-15	1249
	THICKNESS MEAS.	WF33040	PUV0X	TPOLY	3750+/-250 ANG.	TPOLY MEAN 369.7 WFR RANGE 4.2	Z70 AMOR SI	25	1-15	11249

LOT # 50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
IMPLANT CONDITIONS: 1.5E16, 60KEV, 7 DEG, 31P+, E-SHWR=20X										
444	POLY IMPLANT	WF33000	IMPOX			IMP01	ROQUEFORT	25	1/16	11585
485	CAPPING OX DEP	WF32000	NOVOX		1000A 1023		LOWMAN	25	1/17	11120
490	AMOR RTP	WF33010	RTP0X				dopey.1	25	1/17	11585
494	FSI/DEGLAZE	WF33030	FCL0X				AMOROX	25	1/17	11167
	SHEET RHO MEAS.	WF33020				RS MEAN 28.02				
		WF36010	RNC01	SHEET RHO	21.5 - 41.5 Ω /SQ.	RANGE 2.08	AMOR RTP	25	1/17	11167

HOLD FOR JIM SHEU TO PROCESS ****

**** ADD TEST WAFER TO LOAD ****

TARGET 375 A END OF LINE (DEPOSITED OXIDE SAME AS D1114)

600	CAPACITOR OXIDE	WF32000	NOVOX			23750X	Z3750X	25	1/18	11555
	THICKNESS MEAS.	WF33040	PUV0X		325A - 425 A	TW 364 A %STD 47		25	1/18	11555

DO NOT PROCESS 605. MOVE TO 610 IN 1A7

***** DIRECT TRANSFER TO AMORPHOUS SI DEPOSITION ***** **PRECLEAN NOT REQUIRED**										
610	PARTICLE COUNTS	WF35040	KLA01	PARTICLE COUNTS		PRE COUNT 56		25	1/18	10859
	AMORPHOUS SI DEP	WF33015	PVF03			PVF03	2000AMOR	25	1/18	10857
	PARTICLE COUNTS	WF35040	KLA01	PARTICLE COUNTS	<150 PC'S ADDED	POST COUNT 106 PC DELTA 50		25	1-18	11537
	THICKNESS MEAS.	WF33040	PUV0X	TPOLY	2000+/250 ANG.	TPOLY MEAN 1964 RANGE 2	Z70 AMOR	25	1-18	11537

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	- QTY	DATE	SIGN
615	CAP POLY IMPLANT									
		IMPLANT CONDITIONS: 1.0E16, 30KEV, 7 DEG, 31P+, E-SHWR=180mA								
		WF33000	IMPOX	imp02			6223_phoscap	25	1-19	10578
620	RTP Amor	WF33010	RTPOX	RTP02			dopey.1	25	1-19	10578
622	DEGLAZE	WF33020	DCLOX			11.73	DEGLAZE	25	1-19	10578
HOLD FOR ENGINEERING TO PROCESS										
	COAT	WF34005	DNSOX				#3	25	1-19	11257
	ALIGN	WF34004	I4 ONLY EXPOX			RETICLE #11042D	I4: 1700/0.20	↓ ↑	↓ ↑	
	DEVELOP	WF34005	DNSOX				#3			
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.20 to 0.20	X0492 3S0332 - Y0134 3S0373 MEAN - .847 3SIG 1.285		25	1-19	11685
	DICD	WF33430	SEM0X	DICD VISUAL DEFECTS	0.85 +/- 0.10 NONE			25	1-19	11685
	DEVELOP INSPECT	WF34025	INSOX			*2A		25	1-19	11395

*** Measure Data ***

1.Date :1999/01/19_19:19:42
2.Class :7223
3.Recipe Name :L39D187L02A
4.Operator :
5.Lot ID :e0034
6.Process :
7.Equipment :
8.Wafer ID :
9.Comment :

lot No. = 13	
001 Chip=(01,05),MP=1 DN=1	Data=0.8596
002 Chip=(05,01),MP=1 DN=1	Data=0.8791
003 Chip=(05,05),MP=1 DN=1	Data=0.8109
004 Chip=(05,08),MP=1 DN=1	Data=0.8239
005 Chip=(09,05),MP=1 DN=1	Data=0.8621

N=1
aximum = 0.8791
inimum = 0.8109
ean = 0.8471
Sigma = 0.0056

nd_of_data

LOT # 60034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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SPLIT LOT INTO FIVE GROUPS

GROUP 1: WAFERS 1, 2, 3, 4, 5, 22, 23 DO NOT RECEIVE IPO REMOVAL STEP

HOLD FOR JOHN HORVATH TO ETCH										
0630 CAP POLY ETCH	CAP POLY ETCH	WF35050	PETOX		P6T02		WFR # &	Z-24 morphous	7	01-20-99 JH
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE				7	01-20-99 JH
	DRY STRIP	WF35030/5	MASOX					ASH	7	01-20-99 JH
	FSI STRIP	WF33030	RSTOX					RESIST-STRIP	7	01-20-99 JH
	OXIDE REMAINING	WF33040	PUVOX	OX REMAIN				AVG 310 & 310 SDEV 1.46 & 1.40 MEAN 5.39	7	1-20 10181
	FICD	WF33430	SEM0X	FICD VISUAL DEFECTS	infer 74 0.96 +/- 0.12			3SIG -0.15	7	1/20 11357
	FINAL INSPECT	WF31025	INSOX		NONE				7	1-20 10181

UPDATED 12-14-98 mmoo/jsmy/daco

Z37223 TECHNOLOGY

DEVICE : 87L02AAR4107

LOT # 0034

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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GROUP III: WAFERS 11, 12 RECEIVED NO DR RESIST STRIP WITH BOE FOR IPO REMOVAL RESIST STRIP STEP

HOLD FOR JOHN HORVATH TO ETCH										
0630 CAP POLY ETCH	CAP POLY ETCH	WF35050	PETOX			WFR # 11 & 12	Z-2amorphous	2	01-20-99	[Signature]
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			2	01-20-99	[Signature]
	IPO REMOVAL	WF33030	FCL02				ZCAPOFF	2	1/20/99	10982
	FICD	WF33430	SEM0X	FICD	0.98 +/- 0.12	MEAN 0.828 3SIG 0.063	WFR # 11	2	1/22	11357
	FINAL INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			2	1/21	10982

UPDATED 12-14-98 mmoo/jsmy/daco

Z37223 TECHNOLOGY

DEVICE : 87L02AAR4107

LOT # 50034

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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GROUP IV: WAFERS 13, 14, 15, 16, 17, 18, 19, 25 RECEIVED R. RESIST STRIP FIRST DRY ETCH FOR IPO REMOVAL SECOND

HOLD FOR JOHN HORVATH-IOETCH.T***

0630 CAP POLY ETCH	CAP POLY ETCH	WF35050	PEFOX			WFR # & _____	Z-2amorphous	8	01-20-99	<i>[Signature]</i>
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			8	01-20-99	<i>[Signature]</i>
	DRY STRIP	WF35030/5	MASOX				ASH	8	01-20-99	<i>[Signature]</i>
	DRY ETCH IPO REMOVAL	WF35055	OETOX				Z-39 TBD	8	01-21-99	<i>[Signature]</i>
	FSI RESIST STRIP	WF33030	RSTOX				RESIST-STRIP	8	01-21-99	<i>[Signature]</i>
	FICD	WF33430	SEM0X	FICD VISUAL DEFECTS	0.96 +/- 0.12	MEAN <u>2.843</u> 3SIG <u>.074</u>	13	8	01-21-99	<i>[Signature]</i>
	FINAL INSPECT	WF31025	INSOX		NONE			8	01-21-99	<i>[Signature]</i>

LOT # 50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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GROUP: WAFERS 20-21 RECEIVE DRY ETCH FOR IPO REMOVAL FIRST DRY RESIST STRIP SECOND

HOLD FOR JOHN HORVATH TO ETCH										
0630 CAP POLY ETCH	CAP POLY ETCH	WF35050	PETOX			WFR # 20 & 21	Z-2amorphous	2	01-20-99	<i>[Signature]</i>
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			2	01-20-99	<i>[Signature]</i>
	DRY ETCH IPO REMOVAL	WF35055	OETOX				TBD	2	01-21-99	<i>[Signature]</i>
	DRY STRIP	WF35030/5	MASOX				ASH	2	01-21-99	<i>[Signature]</i>
	FSI RESIST STRIP	WF33030	RSTOX				RESIST-STRIP	2	01-21-99	<i>[Signature]</i>
	FICD	WF33430	SEM0X	FICD VISUAL DEFECTS	0.98 +/- 0.12	MEAN 2848 3SIG .082	WFR # 21	2	01-21-99	<i>[Signature]</i>
	FINAL INSPECT	WF31025	INSOX		NONE			2	01-21-99	<i>[Signature]</i>

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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PAGE FOR CAPACITOR SPACER OXIDE SPLITS

WAFERS 1-6, 11, 12, 13, 14, 20, 21, 22, 23, 24, 25 DO NOT RECEIVE CAPACITOR SPACER OXIDE

water #Dore for RTR SP/4 - mch 1-25-78 0900
WATERS 2 3 7 8 16 16 7 RECEIVER TP CAPACITOR SPACER OXIDE

[illegible]
$$x = 15.45$$
$$r = 17.94$$

WAFERS 4 9 18 RECEIVE 1000A DEPOSITED CAPACITOR SPACER OXIDE

NOT ON IAY	SPACER/DEP CLEAN (NO HF)	WF33030 WF33020	FCLOX DCLOX				BEECLEAN	not done	1/25	DACC
	CAP SPACER DEP	WF33200	NOVOX			Spacer 1000	LOWMAN	3	1/22/99	11555
NOT ON IAY		MEASURE WAFER 9 ON SLM08 LOCATION								
		WF32000								
	THICKNESS MEAS.	WF33040	PUVOX			AVG = 936 S = 18.9		3	1/22/99	11555
					1000 A		TBD			

$$\bar{X} = 937$$

WAFERS 5, 10, 19 RECEIVE 2250A DEPOSITED CAPACITOR SPACER OXIDE

NOT ON IAY	SPACER DEP CLEAN (NO HF)	WF33030 WF33020	FCLOX DCLOX				BEECLEAN	not done	'85-	DARO
NOT ON IAY	CAP SPACER DEP	WF33200	NOVOX				S Pacer 2500	3	✓22/99	11555
		MEASURE WAFER 10 ON SLM08 LOCATION								
	THICKNESS MEAS.	WF32000 WF33040	PUVOX				HUG: 2307 S = 58.5	3	✓22/99	11555
				2250			TBD			

$$\begin{aligned} X &= 2289 \\ R &= 59 \end{aligned}$$

TENCOR INSTRUMENTS PROMETRIX UV-1050

Slot#	Waf r ID	Lot ID	Recipe	Coufilm Stack	Layer	Mean	Min	Max	Range	% Std	Std
R7	07	e0034	z70 spacer dep (post dep)	1	2nd Thickness	15.65	5.00	22.93	17.94	33.972	5.32
R9	09	e0034	z70 spacer dep (post dep)	1	2nd Thickness	937.85	922.89	947.19	24.30	0.801	7.51
R10	10	e0034	z70 spacer dep (post dep)	1	2nd Thickness	2289.31	2255.82	2315.19	59.37	0.781	17.88

Z37223 TECHNOLOGY

UPDATED 12-14-98 mmoojsmy/daco

SHEET 16 OF 38

DEVICE : 87L02AAR4107

LOT # 30034

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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WAFERS 2, 6, 7, 11, 12, 13, 14, 15, 16, 20, 21, 22, 23, 24, 25 RECEIVE DO NOT CAPACITOR SPACER OXIDE ETCH

***** HOLD FOR JOHN HORVATH TO PROCESS ***** USE ENDPOINT + 50% OE *****

SPLIT INTO SIX GROUPS FOR SPACER OXIDE ETCH

GROUP A: WAFER 3

SPACER ETCH REMOVES 400A OXIDE (RTP + 375A GAP OXIDE)

NOT ON IAY	1000A SPACER ETCH	WF35055	OETOX				TBD	1	1-25	11228
	FINAL INSPECT	TBD			< 50 A			1	01-25-99	10922

GROUP B: WAFER 4

SPACER ETCH REMOVES 1000A SPACER OXIDE + 375A CAPACITOR OXIDE

NOT ON IAY	1000A SPACER ETCH	WF35055	OETOX				TBD	1	1-25	11228
	POST POLY 1 MEAS.	TBD	PUVOX		< 50 A		TBD			
	FINAL INSPECT	WF31025	INSOX					1	01-25-99	

GROUP C: WAFER 5

SPACER ETCH REMOVES 2250A SPACER OXIDE + 375A CAPACITOR OXIDE

NOT ON IAY	1000A SPACER ETCH	WF35055	OETOX				TBD	1	1-25	11228
	POST POLY 1 MEAS.	TBD	PUVOX		< 50 A		TBD			
	FINAL INSPECT	WF31025	INSOX					1	01-25-99	

DEVICE : 87L02AAR4107

LOT # 50034

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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HOLD FOR JOHN HORVATH TO PROCESS

USE ENDPOINT 50% OE

GROUP D: WAFERS 8-17

SPACER ETCH REMOVES 50 A OXIDE (RTP)

NOT ON IAY	SPACER ETCH	WF35055	OETOX				TBD	2	1-25	11228
	FINAL INSPECT	TBD	03		< 50 A			2	01-25-99	<i>[Signature]</i>

GROUP E: WAFERS 9-18

SPACER ETCH REMOVES 1000 A OXIDE

NOT ON IAY	1000A SPACER ETCH	WF35055	OETOX				TBD	2	1-25	11228
	POST POLY 1 MEAS.	TBD	PUVOX		< 50 A		TBD			
	FINAL INSPECT	WF31025	INSOX					2	01-25-99	<i>[Signature]</i>

Z37223 TECHNOLOGY

LOT # 60034

UPDATED 12-14-98 mmoo/jsmy/daco

DEVICE : 87L02AAR4107

SHEET 18 OF 38

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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HOLD FOR JOHN HORVATH TO PROCESS

USE ENDPOINT 50% OE

GROUP F: WAFERS 10-19

SPACER ETCH REMOVES 2250A OXIDE

NOT ON 1A Y	2250A SPACER ETCH	WF35055	OETOX				P_Z7_SPACER	2	1-25	11/22/98
	POST POLY 1 MEAS.	TBD	PUVOX		< 50 A		TBD			
	FINAL INSPECT	WF31025	INSOX					2	01-25-99	JS

TA WILL SHOW HOLD AT LOCATION 630

WHEN SPACER OXIDE ETCH PROCESSING IS COMPLETE, MOVE TO LOCATION 650

TECNOR INSTRUMENTS PROMETRIX UV-1050

PUV 02

Collect DTime	Lot ID	Wafer ID	Layer	Minimum	Maximum	Range	Mean	% Deviation
01/25/99 16:32	e0034	19	2nd Thickness	3316.00	4116.80	800.80	3584.30	10.847
01/25/99 16:24	e0034	05	2nd Thickness	3329.34	4150.87	821.53	3874.20	10.200
01/25/99 16:21	e0034	04	2nd Thickness	3320.65	3370.75	50.10	3353.26	0.495
01/25/99 16:18	e0034	06	2nd Thickness	3406.66	3436.15	29.48	3419.87	0.365
01/25/99 16:11	e0034	10	2nd Thickness	3322.51	4135.66	813.15	3511.06	9.918
01/25/99 16:08	e0034	09	2nd Thickness	3318.40	3363.28	44.89	3350.91	0.408
01/25/99 16:06	e0034	07	2nd Thickness	3382.41	3403.56	21.15	3393.34	0.181

UPDATED 12-14-98 mmooj/smy/daco

Z37223 TECHNOLOGY

DEVICE : 87L02AAR4107

LOT # 1E0034

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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LOT SHOULD BE MOVED INTO LOC 850

20

GROUP I: WAFERS 1 - 21 RECEIVE 325 A PEARL DEPOSITION

HOLD FOR BRETT LOWE TO PROCESS										
650	PEARL DEP	WF32000	NOVO3 ONLY				EAGLE	21	1-25-98	11602
	REFLECTIVITY	WF33040	PUV0X	PRODUCT REFL.	MEAS. WAFER 6		PEARL REFLECTIVITY	21	1-26-98	11602
		WF32000		TEST WAFER	0.04 TO 0.07					
	THICKNESS MEAS.	WF33040	ELP01	OXYTK			PEARL	21	1-25-98	11602

GROUP II: WAFERS 22 & 23 RECEIVE 800 A PEARL DEPOSITION

HOLD FOR BRETT LOWE TO PROCESS										
650	PEARL DEP	WF32000	NOVO3 ONLY				221 125-98 TBD	2	1-25-98	11602
	REFLECTIVITY	WF33040	PUV0X	PRODUCT REFL.	0.04 TO 0.07		PEARL REFLECTIVITY	2	1-25-98	11602
		WF32000		TEST WAFER						
	THICKNESS MEAS.	WF33040	ELP01	OXYTK			PEARL	2	1-26-98	11602

GROUP III: WAFERS 24 & 25 DO NOT RECEIVE PEARL DEPOSITION

NOT RUN 24 1-25-98

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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HOLD FOR REVIEW OF DCD TARGETING. DO NOT PROCEED WITHOUT JSMY/CARNS APPROVAL. *1-26-99*
 RECOMBINE A BUREAU'S OFFICE TO IN FORCE RE

RECOMBINE ALL WAFERS PRIOR TO L40 EXPOSURE

ALL WAFERS RECEIVE L40 ROW EXPOSURE SPLIT

USE NON WAFFLE L40 MASK. *GA* confirmed. 1-26-99

Left ∇ Left

Leftnc = 0.37 μm (EXP = 1800 J/m²), $D_{\text{L}}\sigma = 0.31 \mu\text{m}$ (2100 J/m²), $D_{\text{L}}\sigma = 0.27 \mu\text{m}$ (2300 J/m²), $D_{\text{L}}\sigma = 0.20 \mu\text{m}$ (2800 J/m²)

HOLD FOR ENGINEERING TO PROCESS (S. BUFFA / J. ADAMS / S. LARSON)										
0795 L40	COAT	WF34005	DNSOX				#3	25	1/26	11357
	ALIGN	WF34004	EXPOX		EXPOSURE	RETICLE # 111546	14: 1650 / 0.2	↓	↓	↓
	DEVELOP	WF34005	DNSOX				#3	↓	↓	↓
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.15 TO +0.15	X=2112 3S.0498 Y=0039 3S.0404		25	1/26	11357
	DICD	WF33430	SEM0X	DICD	DENSE	MEAN		25	1/26	11357
	DEVELOP INSPECT	WF34025	INSOX	VISUAL	0.425+/- 0.04	3SIG	next page	25	1/26	11357
			DEFECTS	NONE				25	1/26	11357

07123A

DECORATION

[illegible]

エチオピア

[illegible]

Leftnc

0.37

0.31

0.27

0.20

INITIALS

QARMS / SMYTHE

1-26-97 1-26-97

Exposure

1801

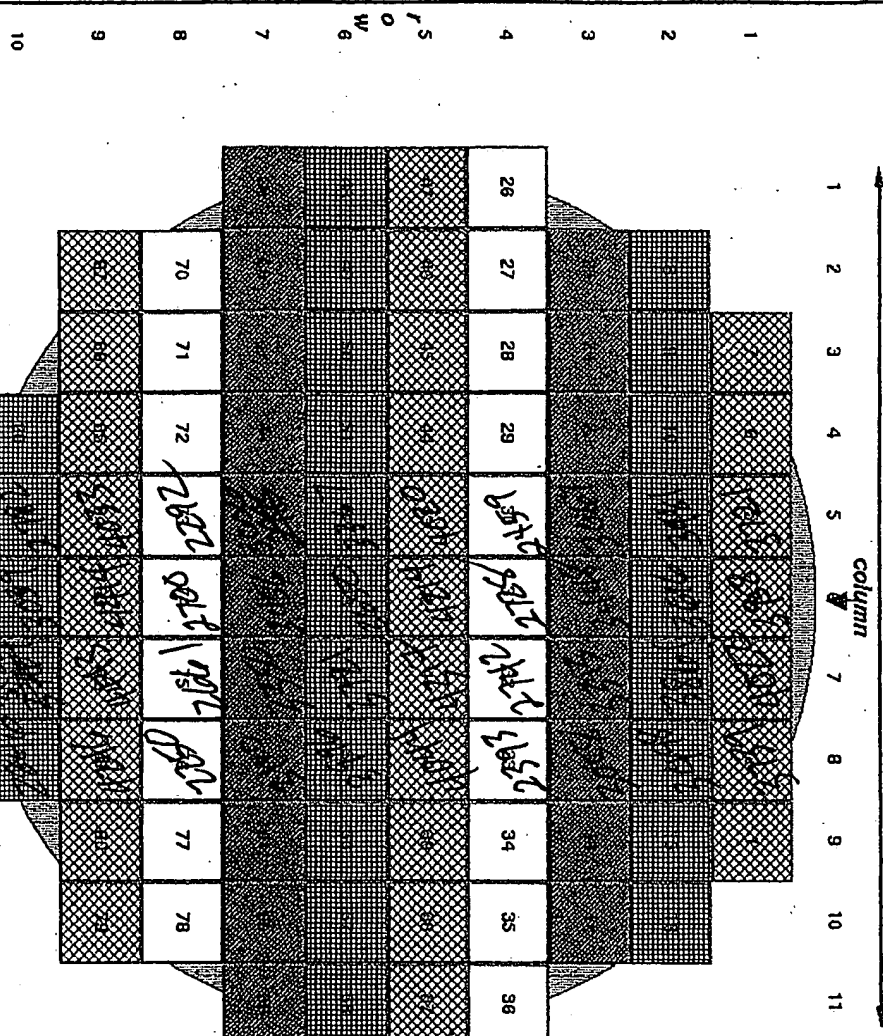
$$\frac{2}{100}$$

2300

2802

DECORATION

diameter = 200.00 +/- 2.50 mm



notch angle = 180.00 degrees

Random -> Exposure

Mode

Column

Row

Exposure Dose J/m2

Exposure J/m2

Paint Shots

Paint Shots Type

☒ 1800.0 J/m2

☐ 2100.0 J/m2

☐ 2300.0 J/m2

new sensor 047 P2007

LOT # 0034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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SPLIT INTO SIX GROUPS FOR NON-WAFER L40 ETCH

GROUP A: WAFERS 1, 2

L40 ETCH REMOVES PEARL (325A) + OXIDE (400A) + POLY 1

Release from Hdd for Brett Love 1-27-99

Blow reading extra cds prior to etch.
Please to take off of hdd. address 1-26-99

HOLD FOR JOHN HORVATH TO PROVIDE RECIPE									
0796 L40 ETCH	POLY ETCH	WF35050	PETOX				WFR #	2 no WAFER HOLD	2 01-27-99
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE				2 01-27-99
	DRY STRIP	WF35030/5	MASOX					ASH	Com b prep
	FSI STRIP #1	WF33030	RSTOX					RESIST-STRIP	w/ rest of lot
	FSI STRIP #2	WF33030	RSTOX					RESIST-STRIP	
	OXIDE REMAINING	WF33040	PUVOX					L40 POLY ETCH	
	SAME AS DI FICD 9/28 1-26-99	WF33430	SEM0X						
	FINAL INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE				

Hold for TD FICD

LOT # 50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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GROUP B: WAFERS 3 - 21

NON-WAFER MASK

L40 ETCH REMOVES PEARL (325A) - POLY 1

HOLD FOR JOHN HORVATH TO PROVIDE RECIPE										
0796 L40 ETCH	POLY ETCH	WF35050	PETOX			WFR #		Small-Poly 1BD	19	01-27-99
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE				19	01-27-99
	DRY STRIP	WF35030/5	MASOX					ASH		
	FSI STRIP #1	WF33030	RSTOX					RESIST-STRIP		
	FSI STRIP #2	WF33030	RSTOX					RESIST-STRIP		
	OXIDE REMAINING	WF35050	WUVOX	OX REMAIN	L10-50 N+ BOX 20 - 70 A REMAIN	OX REMAIN & SDEV & MEAN & 3SIG		L40 POLY ETCH		
	SAME AS DICD FICD 1-26-99	WF33430	SEM0X	FICD DENSE VISUAL DEFECTS	0.45 +/- 0.05 NONE					
FINAL INSPECT										

0796
L40
ETCHCombined w/
rest of lot

→ hold for TD FICD & JH

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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NON-WAFER MASK

GROUP C: WAFERS 22-23

BLAD ETC REMOVES PEARL (800A) + OXIDE (3750) SPOT 13

HOLD FOR JOHN HORVATH TO PROVIDE RECIPE										
0796 L40 ETCH	POLY ETCH	WF35050	PETOX				WFR #		Zno WAFER 500A L40 TBD	01-27-98
	ETCH INSPECT	WF31025	INSOX	VISUAL	DEFECTS	NONE				01-27-98
	DRY STRIP	WF35030/5	MASOX						ASH	
	FSI STRIP #1	WF33030	RSTOX						RESIST-STRIP	
	FSI STRIP #2	WF33030	RSTOX						RESIST-STRIP	
	OXIDE REMAINING	WF35050	PUVOX	OX REMAIN		L10-50 N+ BOX 20 - 70 A REMAIN	OX REMAIN & SDEV & MEAN 3SIG		L40 POLY ETCH	
	SAME AS IDICD FICD	WF33430	SEM0X	FICD DENSE	VISUAL DEFECTS	0.45 +/- 0.05				
	FINAL INSPECT	WF31025	INSOX			NONE				

Hold for TD FICD - JH

LOT # E0034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
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NONWAFER MASK

GROUP D: WAFERS 24, 25

L40 ETCH REMOVES POLY 1 (THERE IS NO PEARL OR OXIDE ON POLY 1)

all wafers combined after etch

HOLD FOR JOHN HORVATH TO PROVIDE RECIPE										
0796 L40 ETCH	POLY ETCH	WF35050	PETOX				WFR #	Z-no P-Small Poly TBD	2	01-27-99
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE				25	1-27 11055
	DRY STRIP	WF35030/5	MASOX					ASH	25	1-27 11055
	FSI STRIP #1	WF33030	RSTOX					RESIST-STRIP	25	1-27 10858
	FSI STRIP #2	WF33030	RSTOX					RESIST-STRIP	25	1-27 10858
	OXIDE REMAINING	WF33040	PUNOX	OX REMAIN	L10-50 N+ BOX 20 - 70 A REMAIN			L40 POLY ETCH	25	01-28-99
	SAME AS DICD FICD	WF33430	SEM0X	FICD DENSE	0.45 +/- 0.05			MEAN 3SIG	25	1-28 10186
	FINAL INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			See Attached	25	01-28-99

Hold for TD FICD a. JPH 01-27-99

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
803	CLEAN	WF33030 WF33020	FCLOX DCLOX			FCLO1	BEECLEAN	75	1-28	10859
	GRAND OX	WF33015	AVFOX				GRANDOX	25	1-28	10131
	THICKNESS MEAS.	WF33015 WF33040	PUVOX	TOX	L10-50 N+Box 60 +/- 25 ANG	TOX <u>48.84</u> WFR Range <u>3.36</u>	GRANDOX	25	1-28	10980
	COAT	WF34005	DNSOX				1	25	1-28	11361
809 L40.9 P-LDD MASK	ALIGN	WF34000/ WF34004	EXPOX			RETICLE # <u>110380</u>	12: 2000/0.1 14: 2000/0.1	25	1-28	11361
	DEVELOP	WF34005	DNSOX				1	25	1-28	11361
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.24 TO 0.24	X: <u>0343</u> 3S .D <u>32</u> Y: <u>0564</u> 3S .D <u>395</u>		25	1-28	11361
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	1-29	11361
	PREIMPLANT BAKE	WF34015	DUV0X				IMPLANT	25	1-29	11361
IMPLANT CONDITIONS: P-LDD 1.6E14, 45KEV, 11 DEG QUAD, 49BF2+										
811	P-LDD IMPLANT	WF33000	IMP01				FROLLO	25	1-29	11121
	THERMAWAVE	WF36050	TWU01	TWU		TWU MEAN UNF <u>111</u>	Therma-wave	25	1-29	11121
820	DRY STRIP	WF35030 WF35035	ASHOX MASOX			END PT. TIME <u>31</u> COMPLETE TIME <u>2:58</u>	ASH ϕ 2	25	1-29	11121
	FSI STRIP	WF33030	RSTOX				RESIST-STRIP	25	1-29	10856
	FINAL INSPECT	WF31025	INSOX	POLYMER DEFECTS	NONE			25	1-29	10141

LOT # 50034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
854	N-LDD IMPLANT	WF33000	IMP01			87 gmpo1	ESMERALDA	25	1-29	10674
	THERMAWAVE	WF36050	TWU01	TWU		TWU MEAN UNF	Imawave down	25	1-29	10674
857	LDD SPACER:DEP CLEAN (NO HF)	WF33030 WF33020	FCLOX DCLOX				BEECLEAN	25	1-29	10888
	Z70 SPACER	WF32000	NOV0X		NOV03	puv02 spacer	BANKS (MACRO)	25	1-29	10888
865	THICKNESS MEAS.	WF32000 WF33040	PUV0X	TEOS	1500 +/- 150	FOX DELTA 1403 %STD 2.37	Z70 SPACER	25	1-29	10888
	Z70 SPACER ETCH	WF35055	OET0X			OET03	P_Z7_SPACER	25	1-29	10672
867	POST FOX MEAS.	WF35055 WF33040	PUV0X		FOX DELTA 350 +/- 200 A	FOX DELTA 228 WFR RANGE 135	Z70 SPACER ETCH	25	1-29	10672
	FINAL INSPECT	WF31025	INS0X	VISUAL				25	1-29	11101
875	SPACER RTP	WF33010	RTP0X				bashful.1	25	1-29	11585

LOT

#3034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
900 L41 N+ S/D MASK	COAT	WF34005	DNSOX				1	25	1-29	11344
	ALIGN	WF34000/4	EXPOX			RETICLE # 1P430	12: 240/0.1 14: 2400/0.1	1	1-29	↓
	DEVELOP	WF34005	DNSOX				1	11	1-29	↓
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.24 TO 0.24	X: 0.07083S 0.4489 Y: -0.0923S -0.0360		25	1-30	11361
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	1-30	11461
	PREIMPLANT BAKE	WF34015	DUVOX			0n102	IMPLANT	25	1-30	11361
IMPLANT CONDITIONS: 1.0E15, 80 KEV, 5 DEG QUAD, 75As+, E-SHWR 40mA										
930	N+ S/D IMPLANT	WF33000	IMPOX	1MP 03			RUFUS	25	1/30	10974
	THERMAWAVE	WF36050	TWU01	TWU		TWU MEAN 10888.5 UNF 7.7		25	1-30	11686
933	DRY STRIP	WF35030 WF35035	MASOX ASHOX			END PT. TIME 21 COMPLETE TIME 2217	ASH 02	25	1-30	11686
	FSI STRIP	WF33030	RSTOX			RST01	RESIST-STRIP	25	1-30	11585
	FINAL INSPECT	WF31025	INSOX	POLYMER DEFECTS	NONE			25	1-30	11587

CP

LOT #E0034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
960 L42 P+ S/D MASK	COAT	WF34005	DNSOX			4409	1	25	1/30	10262
	ALIGN	WF34000 WF34004	EXPOX			RETICLE #110440	12: 220/0.1 14: 2200/0.1	25	1/30	10262
	D DEVELOP	WF34005	DNSOX				1	25	1/30	10262
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.24 TO 0.24	X 10919 3S .0156 Y -10277 3S .039		25	1/30	10262
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	1/30	10262
	PREIMPLANT BAKE	WF34015	DUVOX			DUV04	IMPLANT	25	1/30	10262
IMPLANT CONDITIONS: 1.0E15, 50KEV, 5 DEG QUAD, 49BF2+, E-SHWR 40mA										
962	P+ S/D IMPLANT	WF33000	IMPOX				MCLEACH	25	1/30	11585
	THERMAWAVE	WF36050	TWU01	TWU		TWU MEAN 20452.8 UNF .68		25	1/30	11585
963	DRY STRIP	WF35030 WF35035	MASOX ASHOX			END PT. TIME 33 COMPLETE TIME 2056	ASH 03	25	1/30	11585
	FSI STRIP	WF33030	RSTOX			In 2141 Out 2212	RESIST-STRIP	25	1/30	11585
	FINAL INSPECT	WF31025	INSOX	POLYMER DEFECTS	NONE			25	1/30	11585

LOT # 10034

DEVICE : 87L02AAR4107

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
974	CLEAN	WF33030 WF33020	<u>ECLOX</u> DCLOX			FCL07	<u>BEECLEAN</u>	25	1-30-99	11571
	N2 LATTICE CURE	WF33015	AVFOX			AVF01	<u>LATTICE</u>	25	1-31-99	11571
985	THICKNESS MEAS.	WF33040	PUVOX			415	BPSG I DEP (pre)	25	1/31	10485
	BPSG I DEP	WF32000	NOVOX		(1000 TEOS) (9000 BPSG)		<u>CHALLIS</u> (MACRO)	25	1/31	11690
	THICKNESS MEAS.	WF32000 WF33040	PUVOX	TBPSG	10000 +/- 550 A	SLOT# 13 FOX DELTA 956 %STD 0.71	BPSG I DEP (post)	25	1/31	10485
1000	RTP I DENSIFICATION	WF33010	RTPOX			RTP01	<u>grumpy.1</u>	25	1-31	11144
1005	BPSG I CMP	WF35095	COP01				<u>MARBLET2</u> WFR_CLN_OX			
	THICKNESS MEAS.	WF33040	PUVOX	OX REMOVED	6000 +/- 800 A	MP1 Delta <u>1000</u> MP1 STD <u>10%</u>	POST BPSG I CMP	25	2/3	34 Bm
						MP2 Delta <u>1000</u> MP2 STD <u>10%</u>				
						MP3 Delta <u>1000</u> MP3 STD <u>10%</u>				
						MP4 Delta <u>1000</u> MP4 STD <u>10%</u>				
	FINAL INSPECT	WF31025	INSOX		NONE			25	2-3	10551
	BPSG 2	WF32000	NOVOX				HAILEY (MACRO)	25	2/3	10507
1010	THICKNESS MEAS.	WF32000 WF33040	PUVOX	TBPSG	3000 +/- 400 A	SLOT# 13 FOX DELTA 2990 %STD 0.54	POST BPSG II N0102	25	2/3	10507
1015	2ND RTP DENSE	WF33010	RTPOX			RTP02	sneezy.1	25	2/3	10557

Ⓢ HOLD FOR BOARD M/DRAWN TO PROCESS
 1-29-99 R00445

LOC 1000 - KLA W#07 - 1161 color variation
 & Module looking defect
 7 late center missing data

LOT # 60034DEVICE : 87L02AAR4107 2-3-97

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1095 L50 CONT MASK	COAT	WF34005	DNSOX	<u>4989</u>			<u>6</u>	<u>25</u>	<u>2-3</u>	<u>10157</u>
	ALIGN	WF34004	14 ONLY EXPOX			RETICLE # <u>110500</u>	14: 4700 / 0.25	<u>1</u>	<u>1</u>	<u>1</u>
	DEVELOP	WF34005	DNSOX				<u>6</u>	<u>1</u>	<u>1</u>	<u>1</u>
	KLA5011	WF35000	OLY01	OVERLAY	-0.15 TO 0.15	<u>X 0835 3S 1196</u> <u>Y -0821 3S 1083</u>	<u>2TRN'd</u>	<u>25</u>	<u>2/3</u>	<u>10760</u>
	DICD	WF33430	SEM0X	DICD DENSE	0.41 +/- 0.08	<u>MEAN 4689</u> <u>3 SIGMA 5509</u>	<u>#15</u>	<u>25</u>	<u>2/3</u>	<u>10760</u>
	DEVELOP INSPECT	WF34025	INSOX	VISUAL INSPECT	NONE			<u>25</u>	<u>2/3</u>	<u>10760</u>
***** PROCESS IN LAM 4528XL *****										
WAFER FOR 508-NOLAN-10101 SOME WAFERS HAVE DELETED 100 THICKNESS SPLITS OK for production to each <u>BN</u> <u>1-29-</u>										
1100	CONTACT ETCH	WF35055	<u>QET05</u>	<u>1730</u>			<u>P_Z7_CONTACT</u>	<u>25</u>	<u>2-3</u>	<u>10457</u>
	ETCH/INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			<u>25</u>	<u>2-3</u>	<u>10858</u>
	DRY STRIP	WF35030 WF35035	ASHOX MASOX			END PT. TIME <u>36</u> COMPLETE TIME <u>23:45</u>	ASH	<u>25</u>	<u>2-3</u>	<u>10858</u>
	FSI STRIP	WF33030	RSTOX				<u>RESIST-STRIP</u>	<u>25</u>	<u>2-3</u>	<u>11684</u>
	FICDS	WF33430	SEM0X	FICD DENSE	0.45 +/- 0.08	FICD MN <u>4229</u> 3SIG <u>0618</u>		<u>25</u>	<u>2-4</u>	<u>11395</u>
	FINAL INSPECT	WF31025	INSOX	VISUAL/ POLYMER	NONE			<u>25</u>	<u>2-4</u>	<u>11247</u>

INSPECT FOR PARTICLES SEEN AT ET THAT

**** Measure Data ****

1.Date :1999/02/04_00:27:46
2.Class :7223
3.Recipe Name :L50FI87L02A
4.Operator :
5.Lot ID :e0034
6.Process :
7.Equipment :
8.Wafer ID :
9.Comment :

Lot No. = 13

001 Chip=(01,05),MP=1 DN=1	Data=0.4344
002 Chip=(05,01),MP=1 DN=1	Data=0.3926
003 Chip=(05,05),MP=1 DN=1	Data=0.4104
004 Chip=(05,08),MP=1 DN=1	Data=0.4302
005 Chip=(09,05),MP=1 DN=1	Data=0.4389

N=1
aximum = 0.4389
inimum = 0.3926
ean = 0.4229
Sigma = 0.0618

nd_of_data

Z37223 TECHNOLOGY

UPDATED 12-14-98 mmoo/jsmy/daco

SHEET 31 OF 38

LOT # 50034DEVICE : 87L02ARR4107 23-41

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
DO NOT PRECLEAN UNTIL IMPT IS QUALIFIED										
1145	PREMETAL CLEAN	WF33020	MCL01	VISUAL INSPECT			TIMEOUT	25	2/6	11687
	***** MEASURE FIRST 6 SLOTS *****RECORD IN IAY*****									
1150	THICKNESS MEAS.	WF33040	PUV0X	Field Area TOX	12000 +/- 2000A	AVE MEAN <u>13236</u> AVE RANGE <u>1137</u>	PRE WI CMP (PREPOLISH)	25	2/6	10485
	IMP TI	WF32010	SPT02				Mutan	25	2/6	11680
1155	CVD TIN DEP	WF32001	NOV08				RED	25	2/6	1589
1175	STUFFING	WF33010	RTP0X	ATP 02			doc.1	25	2/6	1071

LOT # 50034

DEVICE : 87L02AAR4107 2-8-98

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1178	W DEP	WF32001	NOV07				GREEN	25	2-6	11588
	W I CMP	WF35090	CTP01				RUBY / WFR-CLN	25	2/8	11565
1179	OXIDE REMOVED	WF33040	PUV0X	OX REMOVED	625 +/- 375 A	1) MP1 Delta 656 2) MP1 STD 278 3) MP2 Delta 656 4) MP2 STD 278 5) MP3 Delta 656 6) MP3 STD 278 7) MP4 Delta 656 8) MP4 STD 278	POST W-I CMP (POST) 1) unable to 2) Delta 656 3) Delta 656 4) Delta 656 5) Delta 656 6) Delta 656 7) Delta 656 8) Delta 656	25	2/8	11565
	FINAL INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			25	2/8	11566
	M1 ALCU W/ARC	WF32010	SPT0X				Bambi-CH3/4	25	2-9	10282
1185	REFLECTIVITY	WF33040	PUV0X	REFLECT.	0.13 +/- 0.05	REFLECT 0.139 SDEV 0.0196	METALI ALCU	25	2-9	11398
	THICKNESS MEAS.	WF36010	RNC01	THICKNESS	5500 +/- 350	THICK M1 5634 RANGE 136	METAL / Z7XXX / M1	25	2-9	11398

Hold for John Horvath at FI
 OK of sandon. JH (12-09-99)

Z37223 TECHNOLOGY

LOT # 50034

DEVICE : 87L02AAR4107

C UPDATED 12-14-98 mmooof/smy/daco

SHEET 33 OF 38

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1199	COAT	WF34005	DNSOX				3	25	2/11	11357
	ALIGN	WF34004	I4 ONLY EXPOX	"STR-87L02AAR4107"		RETICLE #12040	14: 2000 / 0.2	↓	↓	↓
	DEVELOP	WF34005	DNSOX				3	↓	↓	↓
	PRE-ETCH BAKE	WF34015	DUVOX				METAL	25	2/11	1105
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	2/11	10232
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.20 TO 0.20	X0362 3S 0.80 Y0045 3S 0.60		25	2/11	10700
	DICD	WF33430	SEM0X	DICD DENSE	0.60 +/- 0.06	MEAN 0.600 3 SIGMA 0.0172	J#13	25	2/11	10700
	METAL 1 ETCH	WF35080	METOX				P_7120_M1	25	02-12-99	10700
	ETCH INSPECT	WF31025	INSOX	VISUAL POLYMER	NONE			25	02-12-99	10700
	SEMITOOL	WF35070	MSTOX				METSTRIP	25	02-12-99	10700
1200	FICDS	WF33430	SEM0X	FICD DENSE	0.60 +/- 0.08	MEAN 0.600 3 SIGMA 0.0172		25	02-12-99	10700
	FINAL INSPECT	WF31025	INSOX	VISUAL POLYMER	NONE			25	02-12-99	10700

① HAND PRIOR TO METAL 1 MASK FOR TD
MAY 1-23 99 0700 HRS

Z3723 TECHNOLOGY

LOT # 0034

UPDATED 12-14-98 mmoojsmy/daco

DEVICE : 87L02AAR4107

SHEET 34 OF 38

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1206	THICKNESS MEAS.	WF32000 WF33040	PUVOX			MEAN <u>12027</u> SDEV <u>3.99</u>	PRE HDP IDL (PRE DEP)	25	2-13	10892
	HDP IMD	WF32000	NOV04				D	25	2-13	10888
	THICKNESS MEAS.	WF32000 WF33040	PUVOX	TTEOS	16000 +/- 550 A	MEAN <u>15969</u> SDEV <u>1.961</u>	POST HDP IDL (POST DEP)	25	2-13	10888
	IMD I CMP	WF35095	COP01				GRANITE/ WFR_CLN_OX	25	2-13	10141
1208	OXIDE REMOVED	WF33040	PUVOX	OX REMOVED	7000 +/- 800 A	MP1 Delta <u>6840</u> MP1 STD <u>---</u>	POST ILD-I CMP	25	2-13	10141
						MP2 Delta <u>684</u> MP2 STD <u>141</u>				
						MP3 Delta <u>---</u> MP3 STD <u>---</u>				
						MP4 Delta <u>---</u> MP4 STD <u>---</u>				
1209	FINAL INSPECT	WF31025	INSOX		NONE			25	2-13	10141
	PECVD-II DEP	WF32000	NOV0X3				MOSCOW (MACRO)	25	2-13	11250
	THICKNESS MEAS.	WF32000 WF33040	PUVOX PUVOX	TTEOS	3000 +/- 400 A	MEAN <u>3124</u> SDEV <u>2.53</u>	POST PECVD-II	25	2-13	11250

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1210 L62 VIA MASK	COAT	WF34005	DNSOX				3	25	2-13	11344
	ALIGN	WF34004	14 ONLY EXPOX	SPR 87L02A L62C		RETICLE #112080	14: 4000 / 0.45	1		
	DEVELOP	WF34005	DNSOX				3	25	2-14	11361
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.20 TO 0.20	X - 0.034 3S .0644 Y - 0.035 3S .1071		25	2-14	11361
	DICD	WF33430	SEM0X	DICD DENSE	0.48 +/- 0.06	MEAN .475 3 SIGMA .007		25	2-14	11361
1216	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	2-14	11361
	***** USE OXIDE XL ETCHER and ASH on MASOX ONLY *****									
	VIA ETCH	WF35055	10ET05			pre (291,985)	P_27_VIA	25	2/14	11551
	OXIDE REMOVED	WF33040	PUV0X	STACK REMOVED	28000 +/- 5000A	OX REMOVED 204/14	L62 VIA ETCH (POST)	25	2/14	11101
	ETCH INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			25	2/14	11101
1217	DRY STRIP	WF35035	MASOX ONLY	MASOX	*** MASOX ONLY ***	END PT. TIME 205 COMPLETE TIME 1105	27_L62	25	2/14	10708
	SEMITOOL	WF35070	MST0X				METSTRIP	25	2/14	10672
	FICDS	WF33430	SEM0X	FICD DENSE	0.50 +/- 0.08	FICD MEAN 0.555 3SIG .0054	#13	25	2/14	11101
	FINAL INSPECT	WF31025	INSOX	VISUAL/ POLYMER	NONE			25	2/14	11101

TENCOR INSTRUMENTS PROMETRIX UV-1050

PUV 02

Slot#	Wafer ID	Lot ID	Recipe	Count	Film Stack	Layer	Mean	Min	Max	Range	% Std	Std
R13	via	e0034	via etch (post etch)	1		GOF	0.227	0.151	0.309	0.158	25.600	0.058
R13	via	e0034	via etch (post etch)	1		1st Thickness	3570.49	651.76	6224.34	5572.59	77.013	2749.73
R13	via	e0034	via etch (post etch)	1	Data Combo	Thickness	26414.94	23351.06	29977.81	6626.74	10.249	2707.26

... CAPACITOR OXIDE SPLIT

1	Novellus	Pre-clean	Cap. Spacer Oxide	Capacitor Spacer Oxide Thick (A)	Spacer Etch	Pearl Deposition	Reflectivity
2	Novellus	---	---	---	---	Y (325A) 350	.4058 .0061
3	Novellus	---	RTP	---	---	Y (325A)	.4215 .0060 X 2 ✓
4	Novellus	---	RTP	---	A	Y (325A)	.0616 .0017
5	Novellus	Y	DEP	1000	B	Y (325A)	.0616 .0026
6	Novellus	Y	DEP	2250	C	Y (325A)	.0625 .0025
7	Novellus	---	---	---	---	Y (325A)	.0644 .0008 60
8	Novellus	---	RTP	---	---	Y (325A)	.0669 .0029
9	Novellus	---	RTP	---	D	Y (325A)	.0598 .0014
10	Novellus	Y	DEP	1000	E	Y (325A)	.0619 .0023
11, 12	Novellus	Y	DEP	2250	F	Y (325A)	.0614 .0024
13, 14	Novellus	---	---	---	---	Y (325A)	.0635 .0081
15, 16	Novellus	---	---	---	---	Y (325A)	.0634 .0099
17	Novellus	---	RTP	---	---	Y (325A)	.0605 .0014
18	Novellus	---	RTP	---	---	Y (325A)	.0614 .0017 16
19	Novellus	Y	DEP	1000	D	Y (325A)	.0591 .0014 17? ✓
20, 21	Novellus	Y	DEP	2250	E	Y (325A)	.0600 .0024
22, 23	Novellus	---	---	---	F	Y (325A)	.0597 .0024
24	Novellus	---	---	---	---	Y (325A)	.0587 .0010
25	Novellus	---	---	---	---	Y (800A)	.0583 .0016 20 ✓
	Novellus	---	---	---	---	N	.1304 .0016
	Novellus	---	---	---	---	N	.1302 .0016
	Novellus	---	---	---	---	N	.5621 .0005 24 ✓
	Novellus	---	---	---	---	N	.5655 .0021

LOT # 60034

DEVICE : 87L02AAR41072-3-99

UPDATED 12-14-98 mmoo/smy/daco

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
***** MEASURE FIRST 6 SLOTS *****RECORD IN IAY*****										
1233	THICKNESS MEAS.	WF33040	PUV0X	Field Area TOX	30000 +/- 5000A	AVE MEAN <u>30006</u> AVE RANGE <u>14754</u>	PRE WII CMP (PREPOLISH)	25	2/14	11690/11687
	RF/IMP TI	WF32010	SPT02				Rafix	25	2/14	11690/11687
	CVD TIN DEP	WF32001	NOV08				RED	25	2/18	10299
	W II DEP	WF32001	NOV07				GREEN	25	2/19	10299
1236	W II CMP	WF35090	CTP01				GARNET / WFR-CLN		2/19	11589
	OXIDE REMOVED	WF33020 WF33040	PUV0X	OX REMOVED	625 +/- 375	MP1 Delta <u>517</u> MP1 STD <u>22</u>	POST W-II CMP (POST)	25	2/19	11589
						MP2 Delta <u>525</u> MP2 STD <u>50</u>				
						MP3 Delta <u>564</u> MP3 STD <u>55</u>				
						MP4 Delta <u>571</u> MP4 STD <u>100</u>				
	FINAL INSPECT	WF31025	INS0X		NONE			25	2/19	11589
	METAL 2 DEP	WF32010	SPT0X 02				Filt-CH3/4	25	2/20	11200
1237	REFLECTIVITY	WF33040	PUV0X	PRODUCT REFLECT.	0.13 +/- 0.05	REFLECT <u>1.2</u> SDEV <u>1.1</u>	METAL II ALCO	25	2/20	11690
	THICKNESS MEAS.	WF36010	RNC01	STACK THICK	8000 +/- 650	AL THICK <u>8140</u>	METAL / Z7XXX / M2	25	2/20	11250

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1240 L65 METAL 2 MASK	COAT	WF34005	DNSOX				3	25	2-20	1088
	ALIGN	WF34004	14 ONLY EXP0X	STR87L0240R4107		RETICLE # 112060	14: 2000/0.2	↓	↓	↓
	DEVELOP	WF34005	DNSOX				3	↓	↓	↓
	PRE-ETCH BAKE	WF34015	DUVOX				METAL	25	2/20	11361
	KLA5011	WF35000	OLY01	OVERLAY (um)	-0.20 TO 0.20	X0139 3S0825 Y-0494 3S0579				
	DICD	WF33430	SEM0X	DICD DENSE	0.60 +/- 0.06	MEAN .5291 3 SIGMA .0372	#13	25	2/20	11664
	DEVELOP INSPECT	WF34025	INSOX	VISUAL DEFECTS	NONE			25	2-20	11344
1243	METAL 2 ETCH	WF35080	METAL METOX				P_7120_M2	25	2-20	11132
	ETCH INSPECT	WF31025	INSOX	VISUAL POLYMER	NONE			25	2/20	11664
	SEMITOOL	WF35070	MSTOX			WFR#	METSTRIP	25	2-20	11326
1245	FICDS	WF33430	SEM0X	FICD DENSE	0.60 +/- 0.08	FICD MEAN .6034 3SIG .0316	#13	25	2/21	11551
	FINAL INSPECT	WF31025	INSOX	VISUAL DEFECTS	NONE			25	2/20	11551
1290	PASSIVATION	WF32000	NOVOX				ARCO (MACRO)	25	2/20	11687

LOT # 50034

DEVICE : 87L02A

LOC	PROCESS	SPEC #	TOOL	PARAMETER	SPEC. WINDOW	ACTUAL	RECIPE	QTY	DATE	SIGN
1295 L70 PAD MASK	PIX COAT	WF34010	PIX01				26	25	2-21	11573
	RESIST COAT	WF34005	DNS0X				17	25	2-21	11573
	ALIGN	WF34000 WF34004	EXPOX		RETICLE # 110460		12: 390/0 14: 3900/0	25	2-21	11573
	DEVELOP	WF34005	DNS0X				27	25	2-21	11361
	ACETONE STRIP	WF35070	MST03		STRIP WHERE <u>1450</u>		Acetone	25	2-21	11608
1300 L70 ETCH	PIX INSPECT	WF34025	INS0X		DI TECH # 102322		INSO1	25	2-21	102322
	PIX CURE	WF34010	PIX01		PIX 01		32	25	2-21	102322
	PAD ETCH	WF35055	OETOX				P-27-Pad P-27-Pad Etch 24 1/23/95	25	2-21	11101
	ETCH INSPECT	WF31025	INS0X					25	2-21	10712
1310	ALLOY	WF33015	YVF01				ALLOY	25	2-21	10672
1337	PIX DESCUM	WF35035	MAS0X				DESCUM		2-21	10672
NOT REVAL PER ATTACHED REVAL TEST REQUEST SHEET										
1339	PROC EVAL	WF36075	PRB01				EG. DEVICE M1 H.P. DEVICE_SLM	25	2-21	11551
1500	SHIP	WF37000								

-FIGURE 23
P-EVAL REQUEST FORM

LOT# STR E0034 REQUESTOR S. GIRLANI DATE 1-7-99

HP TEST NAME 87L02A-SLM EG TEST NAME 87L02AM1

EST. TEST TIME 1 1/2 HRS. SUPERVISOR'S SIGNATURE _____
1:08

PLEASE FILL OUT THE FOLLOWING TABLE AS THE WAFERS ARE TESTED:

WF#	SLOT#	DATE TESTED	START TIME	FILENAME
1	1	2-22-99	1350	STRE0034
2	2	2-23-99	1440	STRE0034-
3	3	2-23-99	2012	STRE0034-f
4	4	2-24-99	0100	STRE0034-g
5	5	2-24-99	0220	STRE0034-h
6	6	2-24-99	0346	STRE0034-i
7	7	2-24-99	0512	STRE0034-j
8	8	2/24/99	1335	STRE0034K
9	9	2/24/99	1450	STRE0034L
10	10	2-24-99	1605	STRE0034M
11	11	2-23-99	0020	STRE0034
12	12	2-23-99	1720	STRE0034N
13	13	2/23/99	0228	STRE0034
14	14	2-24-99	1915	STRE0034O
15	15	2/23/99	0420	STRE0034
16	16	2-24-99	2000	STRE0034-K
17	17	2-25-99	0130	STRE0034-I
18	18	2-25-99	0326	STRE0034-M
19	19	2-25-99	1115	STRE0034
20	20	2/23/99	0615	STRE0034
21	21	2-25-99	1235	STRE0034
22	22	2-25-99	1355	STRE0034
23	23	2-25-99	1515	STRE0034
24	24	2-25-99	1645	STRE0034
25	25	2-25-99	1805	STRE0034

TO BE SUBMITTED TO THE REQUESTING ENGINEER, THEN DISCARDED.

B

DA 2-23-99

FILLED OUT A
CLEAN SHEET.
1st 3 WFRS
WERE SET UP
ON WRONG SLM.
THESE ARE
RETESTED.
SMOD
2-22-99

DO NOT
LETTER TO EN
OF FILE NAI
HP DOES TH
BY ITSELF.
THAT
2-2

SHIPPED E0034A
2-22-99
2/23/99

* SHIPPED E0034.

* SHIPPED E00

* SHIPPED E00